authoritative evidence for the existence of Negritos in Borneo.

The fascinating promises of Mr. Hose when he sent me his invitation to visit him were amply fulfilled so far as time permitted, and we have to thank him for a most enjoyable and instructive visit. Mr. Charles Hose is well known as a highly successful and enthusiastic naturalist. He has made collections in all departments of the land fauna of Sarawak, and he has monographed the mammals and the birds. His geographical explorations are also well recognised; but it is not generally known that he has a most minute and extensive knowledge of all that pertains to the numerous and varied natives that have been entrusted to his sympathetic care. I have seen piles of immensely valuable ethnographical manuscript which we sincerely hope will be suitably and speedily published. Not only has Mr. Hose from time to time presented his old University with numerous zoological specimens, but he has entrusted to me an extensive and very valuable collection of ethnographic specimens which he has given to the University of Cambridge. In addition he has presented the unique collection of stone implements and a large collection of human crania, each skull being labelled with its tribe and provenance.

I shall endeavour on another occasion to do justice to Mr. Hose's success as an administrator. What we were able to accomplish was largely due to those personal qualities of a ruler which awaken a feeling of affection and loyalty in the natives.

The Cambridge University Press will publish the scientific results of the Expedition in due course as a series of memoirs which will be obtainable separately. The volume on experimental psychology will be written by Dr. Rivers and Messrs. Myers and McDougall, with some supplementary observations on the natives of the mainland of New Guinea by Mr. Seligmann. Mr. Ray has ample matter for a volume on linguistics.

The linguistic results of the Expedition were on the whole very satisfactory. Materials were obtained for complete grammars of the two Torres Straits languages, and the vocabularies were revised. In New Guinea the Melanesian languages around Hood Bay were studied, as well as those of Rabao (Yule Island) and the adjacent mainland. In New Guinea also material was obtained to elucidate the somewhat complex structure of the Papuan languages of the Koitapu in the Port Moresby district, of the Cloudy Bay peoples, and of the Kiwai and Mowatta tribes in the Fly Delta. No grammar of any of these languages has hitherto been written. The materials obtained in Borneo for grammars of the two dialects spoken by the Land Dayaks and Sea Dayaks, and vocabularies obtained in forty-six dialects spoken by various tribes of Sarawak have already been referred to.

The physical anthropology of Torres Straits and New Guinea will mainly be worked out by myself, but Mr. Seligmann has some additional measurements from the mainland of New Guinea. Dr. Rivers will publish and expound his statistical inquiries. Mr. Myers is making a comparative study of native music. Mr. Seligmann has studied native medicines and charms, and has made various ethnological observations of some interest. Mr. Wilkin has made notes on native houses in New Guinea. The religious ceremonies, legends, and general ethnology will be treated by various members of the Expedition. Mr. Wilkin took a large number of excellent photographs in Torres Straits and New Guinea, which will be drawn upon for illustrative purposes. As there is no room for them in the present Museum of Archæology and Ethnology, the extensive collections are deposited temporarily in a couple of small houses in Cambridge, where, unfortunately, they run risk of deterioration.

ALFRED C. HADDON.

WHY PEOPLE GO TO SPAS.

ANY observer who has the curiosity to pass in review the modern methods of medical treatment cannot fail to be struck by the increasing amount of attention which is being paid at the present time, both by the laity and the profession, to the spa treatment of disease. The fact that many thousands of patients flock annually to the different health resorts to seek relief from their ills, and the idea which prevails among a large section of the educated public, chiefly the well-to-do classes, that their existence is not complete without a yearly visit to one or other of the many spas, either at home or abroad, and that for their bodily well-being an annual "cure" is necessary, are phenomena which call for comment and demand explanation. The practice is by no means of recent growth, for it finds its origin in the almost universal belief, prevalent in ancient times, in the efficacy of natural mineral waters and baths in the cure of disease. Many instances of this might be quoted. The waters of Spa in Belgium were celebrated in the time of Livy; the Romans built Bath in England, and fully recognised the value of its springs; and they in turn derived their fondness for bathing from the Greeks. There is not wanting evidence to show that more ancient civilisations appreciated in a rude way the benefits to be obtained in this direction from the resources of nature. Throughout the middle ages the same belief was held, and many were the pilgrimages to the various springs then known. In the present day the same idea, shorn of much of the superstition that formerly clung to it, still prevails, and each watering place claims annually its numerous devotees. Not only among the laity is the assurance of the therapeutic value of natural mineral waters and baths firmly rooted, though doubtless there still remains a substratum of lingering superstition as a part foundation of that assurance, but also by the medical fraternity their utility is accepted, as is witnessed by the freedom with which their patients are sent to take the waters of this or that spring. In the minds of the latter, however, superstition has been replaced by knowledge, and they are well assured that such treatment has a definite and real value.

It becomes, then, a matter of interest to seek answers to the following questions: Whether, in the light of modern knowledge and research there is a solid foundation in fact for the faith that is placed by patients and their doctors in the utility of bathing and water-drinking; whether such measures possess any advantages over treatment by ordinary medicinal means; whether the lines of treatment followed at spas cannot be carried out equally well at the patient's home, and the necessity for a perhaps inconvenient visit to a watering place thereby be obviated; and, lastly, whether equal facilities for such treatment, and results equally good, are not obtainable in this country as at similar places on the continent?

Up to comparatively recent times the use of waters and baths in the cure of disease was purely empirical. Through long experience and repeated trial it came gradually to be ascertained that certain waters were beneficial in certain cases, and certain kinds of baths produced certain effects; wherefrom was elaborated a system of spa treatment on more or less rule of thumb principles. The exact nature of the action of these agents, the physiological effects they produced and the pathological conditions they influenced were ill-understood; the rationale, in short, of the treatment was wanting. Of late years, however, a large amount of sound scientific work has been done in this department of medicine. The action of mineral waters and baths has been made the subject of definite experiment and the results obtained applied to the perfection and extension of the methods; and thereby this branch of therapeutics, which formerly afforded tempting opportunities for scornful criticism on the part of the more advanced members of the profession, has now been placed on a firm scientific basis, and the ancient faith in it fully justified.

In this as in many kindred subjects the lead was taken by Germany, and as the result of much painstaking research a large amount of literature has appeared relating to the various spas in that country. Latterly the home watering places, such as Bath, Buxton, Droitwich, Harrogate, Leamington, Llandrindrod, Strathpeffer and others, have been brought more prominently before the notice of medical men, and through them to the public, by reason of similar research work conducted on scientific lines into the nature of the action of their respective waters and baths, by which their claims to equality with, if not superiority over, many of the continental resorts have been abundantly demonstrated. To illustrate this let us take Harrogate as an example, as possessing the greatest number and most varied assortment of mineral springs, and the most complete bathing establishment in this country, if not in Europe, and consider it with regard to its waters and baths. The former, some eighty in number, may be classified into certain groups of saline-sulphur waters, alkaline-sulphur waters, pure sulphur waters, saline-chalybeate waters, and pure chalybeates, each group embracing several members presenting fine gradations in quality and strength. The most important of these are set apart for drinking purposes; the others being collected, stored, and used for bathing. Long experience and trial of the waters has indicated the class of diseases in which they may be expected to prove beneficial, either individually or in combination, and these fall somewhat definitely into the following main groups, which, however, by no means include all cases which may derive benefit: disorders of the liver, functional or organic; cases of gout in its many manifestations; cases of rheumatism and so-called rheumatic gout; and cases of skin disease. The results obtained have been good, though based upon empirical knowledge, and a considerable reputation has been built up. In recent years, however, this has been strengthened by experimental work which has been carried out to determine the *modus operandi* of many of the waters, and the results of these researches have not merely corroborated in the main empirical practice, and furnished reasons for it, but have indicated new directions in which these agents may be advantageously employed. For example, the Old Sulphur Spring, the most valuable possession of Harrogate, has long been used in the past as a stimulant to the liver in sluggish or congested conditions of that organ. Recent research has shown by experiment on man and on animals that administration of this water definitely increases the flow of bile, as to rapidity, quantity, and the amount of solid constituents. And a further indication of increased activity of the liver is proved by an increase in the amount of urea eliminated from the body. It has been used largely as a valuable remedy in gout, a part explanation of which is furnished by the diminished production of uric acid, which experiment shows to be one of the effects of this water. It has a well-marked effect on the blood in diluting it and diminishing slightly the amount of hæmoglobin, which explains its frequent use in plethoric conditions. The milder sulphur waters have been shown to have similar effects to a less extent. Further, the group of iron waters have been examined, and their effect on the blood in the building up of hæmoglobin repeatedly proved, and other unsuspected results on the general vital processes of the body been discovered, the Chloride of Iron water, for example, markedly increasing the elimination of urea, and diminishing that of uric acid; the "Kissingen" water

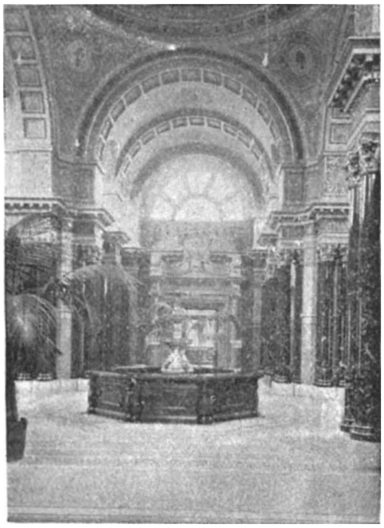


FIG. 1.—Entrance-hall and pump-room at the Royal Baths, Harrogate.

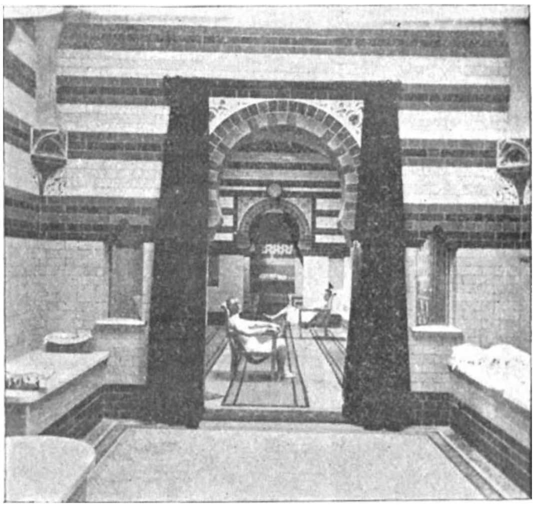


FIG. 2.—Interior of the Turkish Bath.

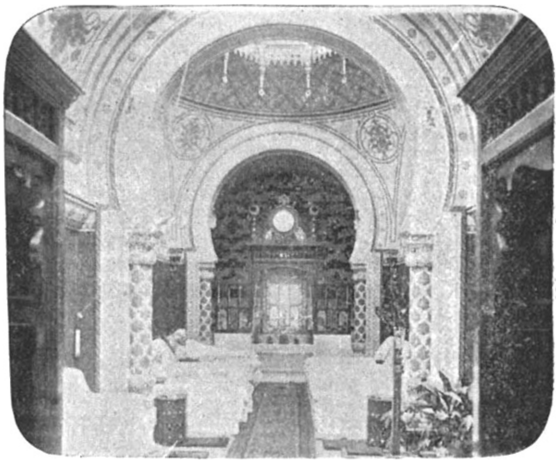
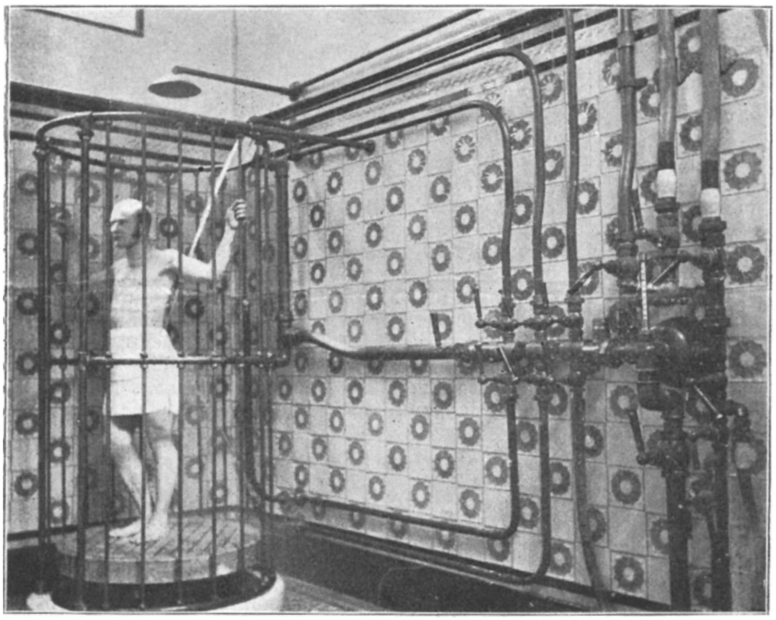


FIG. 3.—Cooling room of Turkish Bath.

increasing the flow of bile without increasing the solid constituents; and so forth. Research of this description has been and is being carried on in the health resorts of this country, and though finality has by no means been reached, yet such endeavours to add to our knowledge should go far to enhance the reputation of each, to increase the confidence of patients who seek health there, and to remove any lingering prejudices that may still remain in the minds of scientific men as to the true worth of such treatment.

With regard to the baths, inquiry as to their mode of action has proved quite as satisfactory as in the case of the mineral waters. Through the forward policy adopted at Harrogate in providing a new and magnificent suite of baths including almost every variety, and replete with every modern convenience, it is possible there to undertake and carry out any line of balneo-therapeutic treatment that may be desired. The methods in use at the continental spas have been adopted and in some cases improved upon, any new development being at once installed and its utility or otherwise determined. The baths available, using the word bath in its widest sense, may be classified into (*a*) *Thermal* baths, depending for their action mainly on the element of temperature, and including plain water baths, hot and cold, Turkish, Russian, superheated air baths, &c. (*b*) *Thermo-chemical* baths, in which there is added to the effects of temperature the effect of the chemical constituents of the water. They include the saline sulphur baths, alkaline-sulphur baths, saline baths, Nauheim baths, &c. (*c*) *Thermo-mechanical* baths, in which there is added to the effect of temperature the mechanical action of the water in the form of sprays, douches, effervescence, &c., with or without the mechanical effect of massage. These include the needle bath, combined needle and douche, running sitz bath, &c., and those with massage, the Aix douche and the Vichy douche. (*d*) *Thermo-electrical* baths, in which a current of electricity, either constant or interrupted, is passing through the water.



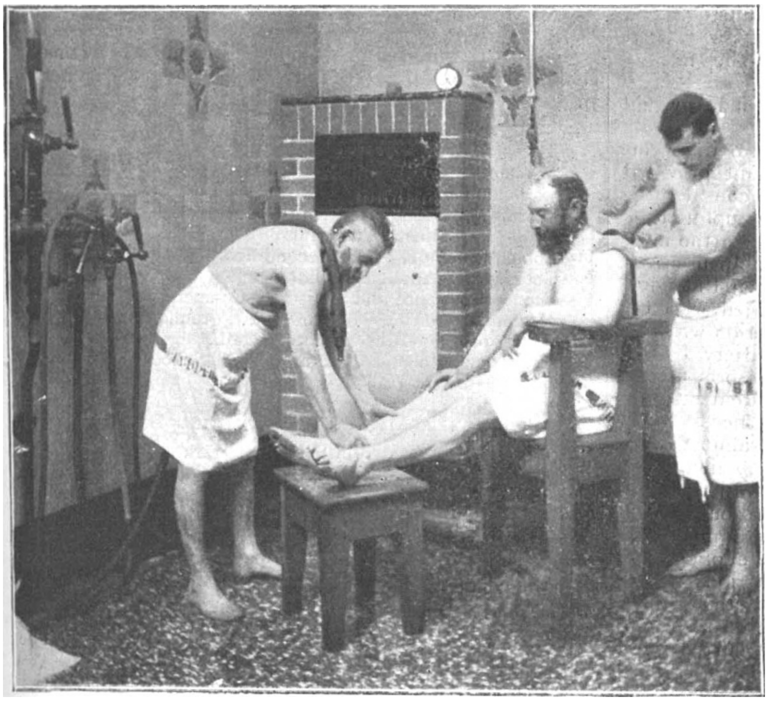
Greaves.] [*Harrogate.*

FIG. 4.—The combined needle and douche bath.

Each and all of these baths have their special effects, and abundant observations have been made to determine them experimentally as a guide to their intelligent use. The factors at work in the human organism that are disturbed in greater or less degree by even simple baths are so many, and their interaction so complex, that it becomes a matter of great difficulty, in the first place to measure them, and, in the second place, to estimate their relative importance; while in the case of the more complicated baths, where different elements, thermal, chemical or mechanical, are brought into play to disturb these factors, some in one direction and some in another, often apparently in direct opposition to each other, the difficulty becomes even greater. Thus, while we are able to ascertain approximately the net physiological result in any given case, it is impossible in the present state of our knowledge to do more than hazard conjectures as to the exact mode by which that result was produced—to what extent one factor was concerned and to what extent another. Still, in spite of the difficulty, collation of the results of various workers at home and abroad enables us to understand in some degree the rationale of bath treatment, and to place it on a sound physiological basis.

The influence of bathing in its various forms on the animal economy is profound, and no one who has not specially observed the effects produced can form an adequate idea of how potent that influence is. Broadly speaking, it may be said that the effects produced are the result of changes that take place in the circulatory system, which is the system mainly acted upon by the factors—thermal, chemical or mechanical—that may be at work.

The heart, driving the blood with its contained nutriment, derived from the alimentary canal, through a closed system of tubing, consisting of arteries, capillaries and veins, enables that fluid to penetrate to all parts of the body, there to deliver up its charge of food to the tissues by interchange of fluid through the thin capillary wall; receiving in exchange the waste products from the tissues, and bearing them away to be eliminated from the system. Variations in the amount of blood, and the force with which it is driven into the circulation at each heart beat, and variations in the calibre of the closed system of tubing will, with other factors, determine the tension of the circulation, or fluid pressure under which the blood is working—the blood pressure, as it is called. These variations are controlled by a nerve apparatus, the vaso-motor mechanism, whereby dilatation of vessels in one region of the body is compensated for by contraction in another, and the average level of blood pressure maintained, or changes produced therein. On the integrity of this nerve mechanism, and the perfect performance of its functions, the maintenance of health largely depends, for by it the ebb and flow of vessel constriction and dilatation is controlled, and the circulation enabled to adjust itself to the rapid succession of changes that take place in the environment of the organism—changes due to gravity, posture, exercise, digestion and the like. Further, on these changes in blood pressure depends to a large extent the ebb and flow of fluid through the capillary wall, whereby nourishment is conveyed to and waste products removed from the tissues; and, consequently, where this function is impaired the nutrition of the whole body suffers. By the recent introduction of new instruments it is possible to measure directly the blood pressure in the human subject, and to observe its variations from hour to hour or day to day; and also to measure the varying calibre of the arteries in the extremities We are thus able to form a fairly accurate estimate of the conditions of the circulation, and from these observations to infer the completeness or otherwise of the nutritional processes on which depend the well-being of the individual. In different morbid conditions the blood pressure may deviate considerably from the normal, the vaso-motor mechanism be impaired, and the free interchange of blood plasma and tissue fluid be defective, to the detriment of the organism. Experiment has shown that the blood pressure is markedly affected by baths, some procedures having the effect of raising it and some the reverse. The effect, though at first temporary, is cumulative, so that a permanent modification of pressure may be obtained, from which it follows that an intelligent use of bathing as a therapeutic agent can so act on the circulatory system as to regulate the blood pressure, restore the normal mobility of the vessels, promote the interchange of tissue fluid, and profoundly modify nutrition. By means of these new methods we can watch closely the changes occurring under treatment, and can adjust the latter to the requirements of any particular case with a delicate nicety.

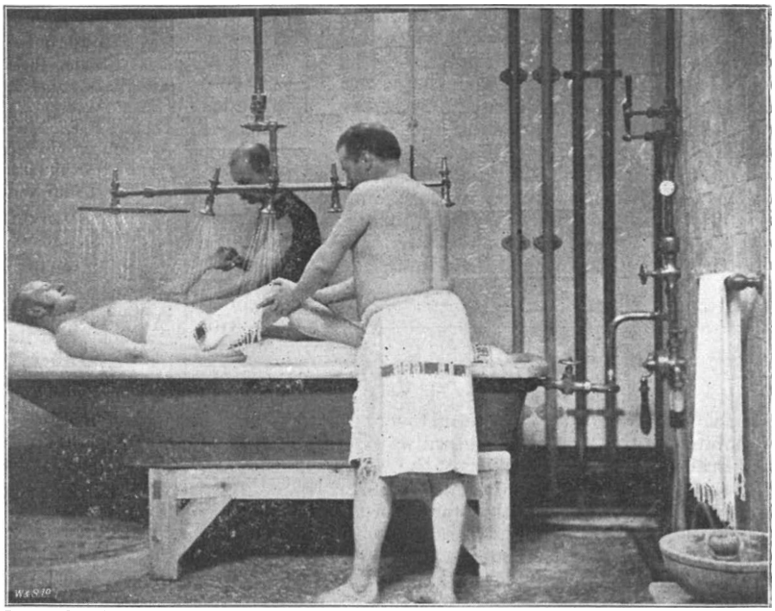


Greaves.] [Harrogate.

FIG. 5—The Aix douche.

A few instances may be given of the effect of various baths on the blood pressure. Heat in all forms, whether dry as in the Turkish bath and superheated air baths, or moist as in the Russian bath, or the simple immersion bath, lowers the pressure. Cold, on the other hand, has the effect of raising it. The chemical constituents of the water in the case of the saline and sulphur baths also exert an influence, augmenting the fall in pressure resulting from warm baths. The percussion of water impinging sharply on the skin, as in the needle bath, tends to raise the blood pressure. Massage to the limbs and body causes a fall in pressure, provided the abdomen be not massaged too vigorously; deep pressure and manipulation of this part is followed by a marked rise in pressure owing to the dispersal of blood from the capacious veins of the viscera into the general circulation. In the Aix and Vichy douches massage is combined with warm douching.

In the former bath, massage is administered under a simple douche conveyed by a flexible pipe passing over the shoulder of the attendant and playing between his hands, the patient being in the sitting posture. The result on the blood pressure is to produce a fall, the massage and heat acting in the same direction. In the Vichy douche, however, the patient lies in the recumbent position, and is massaged under a needle spray falling from a bracket suspended over the table. Owing to the position adopted, massage of the abdomen is more freely performed, and this, combined with the tonic effect of the percussion of the needle spray, produces as a net result a rise in pressure.



Greaves.] [Harrogate.

FIG. 6.—The Vichy douche.

The above considerations as to the mode by which tissue change is stimulated and nutrition modified by agents brought to bear on the circulatory system, serve to explain certain more remote effects experienced as the result of baths. To enter into these in detail is impossible within the limits of an article of this description: suffice it to mention one bath only. The Aix douche has the effect of increasing the amount of urea eliminated, and the excretion of uric acid is markedly augmented, which fact, viewed in conjunction with the diminished production of uric acid resulting from administration of the old sulphur water, explains the happy results obtained in the treatment of gout by the use of this water and bath, the one diminishing the production of the *materies morbi*, the other facilitating its elimination.

In answer to the question first propounded, it would appear then that modern research has not only abundantly justified pre-existing views as to the value of spa treatment, and has to a large extent provided sound reasons for them, but has also considerably extended its sphere of usefulness, and has uplifted the methods from the dead-level of empiricism to the more exalted domain of rational and scientific therapeutics.

The foregoing remarks suffice to show that the home watering places have of late years advanced with the times, and are able to claim equal recognition with the best known continental resorts. The variety of the waters to be found at the different health resorts of this country is such as to cover almost all requirements, and there are few cases indeed which it is really necessary to send abroad. In the matter of baths, also, almost every known balneo-therapeutic procedure is obtainable in Great Britain, and the methods of administration are as carefully supervised and as efficiently carried out as elsewhere. The one element in which we are unable to compete with our rivals abroad is in the matter of climate, for we cannot ensure the same protracted periods of sunshine that many of them enjoy. Nevertheless, the weather experienced during the season at the home resorts is not necessarily incompatible with a successful "cure," and is indeed preferred by many, by reason of its bracing qualities, to the hot and relaxing climates of some of the continental spas.

In estimating the value of spa treatment other factors besides the administration of waters and baths must be taken into consideration; such, for instance, as change of air, rest, freedom from business anxieties or household cares, regular habits of living—early rising, simple moderate diet, and so forth—all of which play their part in achieving the end in view. Therein lies the superiority of spa treatment over ordinary medicinal means in suitable cases, mainly of chronic ailments, and the impossibility of fulfilling these necessary conditions renders futile the attempt to follow out similar lines at the patient's own home. Indeed, by many the major influence is attributed to these factors rather than to baths and waters, and in some cases this may be true. But, while recognising fully their importance, the foregoing rough indication of some of the modes in which waters and baths have been proved to act suffices to show that to these the predominant influence must be assigned.

WILFRID EDGECOMBE.

THE DOVER MEETING OF THE BRITISH ASSOCIATION.

INTENDING visitors to the Dover meeting should note that this year the chief railway companies afford additional facilities to members of the Association. They offer a return ticket at a fare and a quarter, issued from September 12 to 20, available for return till September 27. Those who wish to avail themselves of this privilege must obtain from the Secretary a signed cirtificate, which must be given up to the booking clerk when the ticket is purchased. The following railway companies have entered into this arrangement:—The Caledonian, Great Eastern, Great Central, Great Northern, Great Western, London, Brighton and South Coast, London and North Western, London and South Western, Midland, North British, South Eastern and Chatham and Dover. The usual arrangement for places within fifty miles of the place of meeting still holds good, in virtue of which a return ticket at a single fare may be obtained at Dover on production of membership tickets. These tickets are available for return on the same or the following day.

The local programme is now in the press. It may, however, be useful to recapitulate the items of general interest which will appear in the programme.

SECTIONAL MEETING ROOMS.

A—Mathematical and Physical Science—School of Art, second floor.
B—Chemistry—School of Art, first floor.
C—Geology—College Gymnasium.
D—Zoology—School of Art, second floor.
E—Geography—Apollonian Hall.
F—Economic Science and Statistics—Co-operative Rooms.
G—Mechanical Science—School of Art, ground floor.
H—Anthropology—Rifle Volunteer Hall.
I—Physiology—Chemical Lecture Room, School of Art.
K—Botany—Union Hall.

PRESIDENT'S ADDRESS AND EVENING LECTURES.

These will be delivered in the Town Hall.

President's Address.—On Wednesday, September 13, the first general meeting will be held at 8 p.m., when Sir Michael Foster, K.C.B., Sec.R.S., will assume the presidency and deliver an address.

First Evening Lecture.—On Friday, September 15, at 8.30 p.m., by Prof. Charles Richet, of Paris. Subject: "La Vibration Nerveuse."

Second Evening Lecture.—On Monday, September 18, at 8.30 p.m., by Prof. Fleming, F.R.S. Subject: "The Centenary of the Electric Current."

ENTERTAINMENTS AND GARDEN PARTIES.

Thursday, September 14.—The Chairman of the College Council, Dr. E. F. Astley, the Headmaster and Masters of Dover College, invite members, associates, and holders of ladies' tickets to a garden party in the College Close, from 3.30 to 6 p.m.

The Mayor, Councillor Sir W. H. Crundall, J.P., and the Mayoress, Lady Crundall, invite members, associates, and holders of ladies' tickets to a conversazione at the Town Hall, from 8.30 to 11.30 p.m.

Friday, September 15.—Lord George Hamilton, Captain of Deal Castle, invites two hundred members, associates, and holders of ladies' tickets to visit the Castle, from 3.30 to 6 p.m.

A smoking concert in honour of the President, Sir Michael Foster, F.R.S., will be given by the Local Committee in the Apollonian Hall, Snargate Street, commencing at 10 p.m. A selection of music will be performed by the band of the Royal Artillery from Woolwich, by special permission.

Saturday, September 16.—A grand military tattoo will take place on the sea front, opposite Waterloo Crescent, at 9.30. A space will be reserved for members, &c. Admittance on presentation of Association ticket.

Monday, September 18.—The Mayor and Lady Crundall invite members, associates, and holders of ladies' tickets to an "at home" at the Connaught Park, from 4 to 6.30 p.m.

Tuesday, September 19.—On Tuesday afternoon, September 19, a motor-car exhibition will be opened at the Dover Athletic Grounds by the Mayor.

Lord Northbourne invites 200 members, associates and holders of ladies' tickets to visit Betteshanger Park, from 4 to 6 p.m. Light refreshments will be offered.

Lord George Hamilton, Captain of Deal Castle, invites 200 members, associates and holders of ladies' tickets to visit the Castle, from 3.30 to 6 p.m.

The Local Committee invite members, associates and holders of ladies' tickets to a garden fête in the Granville Gardens, from 9.30 to 11.30 p.m. The band of the Royal Engineers, from Chatham, will, by special permission, perform a selection of music during the evening.

THE MUSEUM.

The Dover Museum, in the Market Square, is well worth a visit, as it contains a large number of objects interesting both to